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भाग 1 एम 1 वाहनों की श्रेणी के लिए
कार्यकारी अपेक्षाएँ
(पहला पुनरीक्षण)

**Automotive Vehicles —
External Projection**

**Part 1 Performance Requirements for
M1 Category of Vehicles**

(First Revision)

ICS 43.100

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भारतीय मानक ब्यूरो
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FOREWORD

This Indian Standard (Part 1) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Body, Chassis, Accessories, Garage Equipment Springs and Suspension Systems Sectional Committee had been approved by the Transport Engineering Division Council.

This standard, originally published in 1994 for all category of vehicles. The Sectional Committee had decided to split the standard in two parts.

The purpose of this standard is to reduce the risk of seriousness of body injury to a person hit by, the body work or crushing against it in the event of a collision. There is also likelihood of injury to the passenger if some parts are projected out more than specified, particularly while taking a turn or cornering.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard***AUTOMOTIVE VEHICLES —
EXTERNAL PROJECTION****PART 1 PERFORMANCE REQUIREMENTS FOR
M1 CATEGORY OF VEHICLES***(First Revision)***1 SCOPE**

1.1 This standard applies to external projections of category M1 vehicles as per IS 14272 as amended from time to time. It does not apply to exterior rear view mirrors or to the ball of towing devices.

1.2 The purpose of this standard is to reduce the risk or seriousness of bodily injury to a person hit by the bodywork or brushing against it in the event of a collision. This is valid both when the vehicle is stationary and in motion.

1.3 However, at the request of the vehicle manufacturer, vehicles of category N1 and M2 which are derived from M1 can be type approved as per this standard.

2 REFERENCES

The following standard contains provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standard:

<i>IS No.</i>	<i>Title</i>
14272 : 2011	Automotive vehicles — Types — Terminology

3 TERMINOLOGIES

3.1 Vehicle Type — A category of motor vehicles which do not differ in such essential respect as, shape or materials of the external surface.

3.2 External Surface — The outside of the vehicle and including the bonnet, the lid of the luggage compartment, the doors, the wings, the roof, the lighting and light-signaling devices and the visible strengthening components.

3.3 Floor Line — The floor line determined as follows:

3.3.1 Successively position round a laden vehicle a cone with a vertical axis, the height of which is not defined, and with a half angles of 30 degree in such a way that it contacts, constantly and as low as possible, the external surface of the vehicle. The floor line is the geometric trace of these points of contact.

3.3.2 In determining the floor line, the jacking points, exhaust pipes or wheels shall not be taken into consideration.

The gaps of the wheel arches are assumed to be filled in by an imaginary surface forming a smooth continuation of the surrounding external surface.

At both ends of the vehicle the bumper shall be taken into consideration when establishing the floor line. Dependent upon the particular vehicle the floor line trace may occur at the bumper section extremity or at the body panel below the bumper. Where two or more points of contact occur simultaneously, the lower point of contact shall be used to determine the floor line.

3.4 Radius of Curvature — The radius of the arc of a circle which comes closest to the rounded form of the component under consideration.

3.5 Laden Vehicle — The vehicle laden to the maximum permitted technical mass. Vehicles equipped with hydro-pneumatic, hydraulic or pneumatic suspension or a device for automatic leveling according to load shall be tested with the vehicle in the most adverse normal running condition specified by the manufacturer.

3.6 Extreme Outer Edge — Extreme outer edge of the vehicle means, in relation to the sides of the vehicle, the plane parallel to the median longitudinal plane of the vehicle coinciding with its outer lateral edge, and, in relation to the front and rear ends, the perpendicular transverse plane of the vehicle coinciding with its outer front and rear edges, account not being taken of the projection:

- a) of tyres near their point of contact with the ground, and connections for tyre pressure gauges;
- b) of any anti-skid devices which may be mounted on the wheels;

- c) of rear-view mirrors;
- d) of side direction indicator lamps, end outline marker lamps, front and rear position (side) lamps and parking lamps; and
- e) in relation to the front and rear ends, of parts mounted on the bumpers, of towing devices and of exhaust pipes.

3.7 The Dimension of the Projection — Of a component mounted on a panel, means the dimension determined by the method described in A-2 of Annex A.

3.8 The Nominal Line of a Panel — The line passing through the two points represented by the position of the centre of a sphere when its surface makes its first and last contact with a component during the measuring procedure described in A-2.2 Annex A.

3.9 Aerial — Any device used for transmitting and/or receiving electromagnetic signals.

3.10 Bumper — The front or rear, lower, outer structure of a vehicle. It includes all structures that are intended to give protection to a vehicle when involved in a low speed frontal or rear collision and also any attachments to this structure.

3.11 Bumper Cover — The non-rigid outer surface of a bumper, generally extending across the full width of the front or rear of a vehicle.

4 APPLICATION FOR APPROVAL

4.1 The application for approval of a vehicle type with regard to external projections shall be submitted by the vehicle manufacturer or by his duly accredited representative.

4.2 Information to be submitted at the time of applying for type approval to this standard shall be as given in Annex B.

4.3 The application shall be accompanied with requisite number of samples and/or test pieces.

5 GENERAL SPECIFICATIONS

5.1 The provisions of this standard shall not apply to those parts of the external surface which, with the vehicle in the laden condition, with all doors, windows and access lids, etc., in the closed position, are either:

- a) at a height of more than 2 meters,
- b) below the floor line, or
- c) so located that, in their static condition as well as when in operation, they cannot be contacted by a sphere 100 mm in diameter.

5.2 The external surface of vehicles shall not exhibit, directed outwards, any pointed or sharp parts or any

projections of such shape, dimensions, direction or hardness as to be likely to increase the risk or seriousness of bodily injury to a person hit by the external surface or brushing against it in the event of a collision.

5.3 The external surface of vehicles shall not exhibit, directed outwards, any parts likely to catch on pedestrians, cyclists or motor cyclists.

5.4 No protruding part of the external surface shall have a radius of curvature less than 2.5 mm. This requirement shall not apply to parts of the external surface which protrude less than 5 mm, but the outward facing angles of such parts shall be blunted, except where such parts protrude less than 1.5 mm.

5.5 Protruding parts of the external surface, made of a material of hardness not exceeding 60 shore A, may have a radius of curvature less than 2.5 mm. The hardness measurement shall be taken with the component as installed on the vehicle. Where it is impossible to carry out a hardness measurement by the shore A procedure, comparable measurements shall be used for evaluation.

5.6 The provisions of 5.1 to 5.5 shall apply in addition to the particular specifications of the following 6, except where these particular specifications expressly provide otherwise.

6 PARTICULAR SPECIFICATIONS

6.1 Ornaments

6.1.1 Added ornaments which project more than 10 mm from their support shall retract, become detached or bend over under a force of 10 daN exerted at their most salient point in any direction in a plane approximately parallel to the surface of which they are mounted. These provisions shall not apply to ornaments on radiator grilles, to which only the general requirements of 5 shall apply. To apply the 10 daN force a flat-ended ram of not more than 50 mm diameter shall be used. Where this is not possible, an equivalent method shall be used. After the ornaments are retracted, detached or bent over, the remaining projections shall not project more than 10 mm. These projections shall in any case satisfy the provisions of 5.2. If the ornament is mounted on a base, this base is regarded as belonging to the ornament and not to the supporting surface.

6.1.2 Protective strips or shielding on the external surface shall not be subject to the requirements of 6.1.1, however, they shall be firmly secured to the vehicle.

6.2 Headlights

6.2.1 Projecting visors and rims shall be permitted on headlights, provided that their projections, as measured in relation to the external transparent surface of the headlight does not exceed 30 mm and their radius of curvature is at least 2.5 mm throughout. In the case of

a headlamp mounted behind an additional transparent surface, the projection shall be measured from the outermost transparent surface. The projections shall be determined according to the method described in A-3

6.2.2 Retracting headlights shall meet the provisions of 6.2.1 in both the operative and retracted positions.

6.2.3 The provisions of 6.2.1 do not apply to headlamps which are sunk into the bodywork or which are "overhung" by the bodywork, if the latter complies with the requirements of 6.9.1.

6.3 Grilles and Gaps

6.3.1 The requirements of 5.4 shall not apply to gaps between fixed or movable elements, including those forming part of air intake or outlet grilles and radiator grilles, provided that the distance between consecutive elements does not exceed 40 mm and provided that the grilles and gaps have a functional purpose. For gaps of between 40 mm and 25 mm the radii of curvature shall be of 1 mm or more. However, if the distance between two consecutive elements is equal to or less than 25 mm, the radii of curvature of external faces of the elements shall not be less than 0.5 mm. The distance between two consecutive elements of grilles and gaps shall be determined according to the method described in A-4.

6.3.2 The junction of the front with the side faces of each element forming a grille or gap shall be blunted.

6.4 Windscreen Wipers

6.4.1 The windscreen wiper fittings shall be such that the wiper shaft is furnished with a protective casing which has a radius of curvature meeting the requirements of 5.4 and an end surface area of not less than 150 mm². In the case of rounded covers, these shall have a minimum projected area of 150 mm² when measured not more than 6.5 mm from the point projecting furthest. These requirements shall also be met by rear window wipers and headlamp wipers.

6.4.2 The requirements of Annex B shall not apply to the wiper blades or to any supporting members. However, these units shall be so made as to have no sharp angles or pointed or cutting parts.

6.5 Bumpers

6.5.1 The ends of the bumpers shall be turned in towards the external surface in order to minimize the risk of fouling. This requirement is considered to be satisfied if either the bumper is recessed or integrated within the bodywork or the end of the bumper is turned in so that it is not contactable by a 100 mm sphere and the gap between the bumper end and the surrounding bodywork does not exceed 20 mm.

6.5.2 If the line of the bumper which corresponds to the outline contour of the car vertical projection is on a rigid surface, that surface shall have a minimum radius of curvature of 5 mm at all its points lying from the contour line to 20 mm inward, and a minimum radius of curvature of 2.5 mm in all other cases. This provision applies to that part of the zone lying from the contour line to 20 mm inward which is situated between and in front (or rear in case of the rear bumper) of tangential points with the contour line of two vertical planes each forming with the longitudinal plane of symmetry of the vehicle an angle of 15° (see Fig. 1).

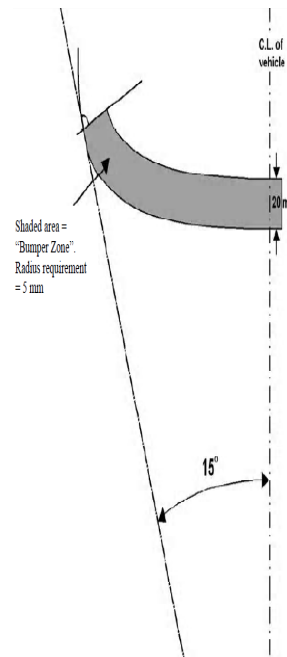


FIG. 1 BUMPER

6.5.3 The requirement of 6.5.2 shall not apply to parts on or of the bumper or to bumper insets which have a projection of less than 5 mm, with special reference to joint covers and jets for headlamp washers; but the outward facing angles of such parts shall be blunted, save where such parts protrude less than 1.5 mm.

6.5.4 The requirement of 6.5.2 above does not apply to the bumper cover. The provisions of 5 remain applicable.

6.6 Handles, Hinges and Push-buttons of Doors, Luggage Compartments and Bonnets, Fuel Tank Filler Caps and Covers

6.6.1 The projection shall not exceed 40 mm in the case of door or luggage compartment handles and 30 mm in all other cases.

6.6.2 If lateral door handles rotate to operate, they shall meet one or other of the following requirements.

6.6.2.1 In the case of handles which rotate parallel to the plane of the door, the open end of handles must be directed towards the rear. The end of such handles shall be turned back towards the plane of the door and fitted into a protective surround or be recessed.

6.6.2.2 Handles which pivot outwards in any direction which is not parallel to the plane of the door shall, when in the closed position, be enclosed in a protective surround or be recessed. The open end shall face either rearwards or downwards.

Nevertheless, handles which do not comply with this last condition may be accepted if:

- a) they have an independent return mechanism;
- b) should the return mechanism fail, they cannot project more than 15 mm;
- c) they comply, in such opened position, with the provisions of **5.4**; and
- d) their end surface area, when measured not more than 6.5 mm from the point projecting furthest, is not less than 150 mm².

6.7 Wheels, Wheel Nuts, Hub Caps and Wheel Discs

6.7.1 The requirements of **5.4** shall not apply.

6.7.2 The wheels, wheel nuts, hub caps and wheel discs shall not exhibit any pointed or sharp projections that extend beyond the external plane of the wheel rim. Wing nuts shall not be allowed.

6.7.3 When the vehicle is travelling in a straight line, no part of the wheels other than the tyres, situated above the horizontal plane passing through their axis of rotation shall project beyond the vertical projection, in a horizontal plane, of the external surface or structure.

However, if functional requirements allow, wheel discs which cover wheel and hub nuts may project beyond the vertical projection of the external surface or structure on condition that the radius of curvature of the surface of the projecting part is not less than 30 mm and that the projection beyond the vertical projection of the external surface or structure in no case exceeds 30 mm.

6.8 Sheet-metal Edges

Sheet-metal edges, such as gutter edges and the rails of sliding doors, shall not be permitted unless they are folded back or are fitted with a shield meeting the requirements of this standard which are applicable to it.

An unprotected edge shall be considered to be folded back either if it is folded back by approximately 180°, or if it is folded towards the bodywork in such a manner that it cannot be contacted by a sphere having a diameter of 100 mm.

The requirements of **5.4** shall not apply to the following sheet metal edges:

- a) rear edge of bonnet; and
- b) front edge of rear luggage boot.

6.9 Body Panels

Folds in body panels may have a radius of curvature of less than 2.5 mm, provided that it is not less than one-tenth of the height "H" of the projection, measured in accordance with the method described in **A-1**.

6.10 Lateral Air or Rain Deflectors

Lateral deflectors shall have a radius of curvature of at least 1 mm on edges capable of being directed outwards.

6.11 Jacking Brackets and Exhaust Pipes

The jacking brackets and exhaust pipe(s) shall not project more than a distance of 10 mm beyond the vertical projection of the floor line lying vertically above them. As an exception to this requirement, an exhaust pipe may project more than 10 mm beyond the vertical projection of the floor line, so long as it terminates in rounded edges, the minimum radius of curvature being 2.5 mm.

6.12 Air Intake and Outlet Flaps

Air intake and outlet flaps shall meet the requirements of **5.2**, **5.3** and **5.4** in all positions of use.

6.13 Roof

6.13.1 Opening roofs shall be considered only in the closed position.

6.13.2 Convertible vehicles shall be examined with the hood in both the raised and lowered positions.

6.13.2.1 With the hood lowered, no examination shall be made of the vehicle inside an imaginary surface formed by the hood when in the raised position.

6.13.2.2 Where a cover for the linkage of the hood when folded is provided as standard equipment, the examination shall be made with the cover in position.

6.14 Windows

Windows which move outwards from the external surface of the vehicle shall comply with the following provisions in all positions of use:

- a) No exposed edge shall face forwards; and
- b) No part of the window shall project beyond the extreme outer edge of the vehicle.

6.15 Registration Plate Brackets

Supporting brackets provided by the vehicle manufacturer for registration plates shall comply with

the requirements of 5.4, if they are contactable by a 100 mm diameter sphere when a registration plate is fitted in accordance with the vehicle manufacturer's recommendation.

6.16 Luggage Racks and Ski Racks

6.16.1 Luggage racks and ski racks shall be so attached to the vehicle that positive locking exists in at least one direction and that horizontal, longitudinal and transverse forces can be transmitted which are at least equal to the vertical load-bearing capacity of the rack as specified by its manufacturer. For the test of the luggage rack or ski rack fixed to the vehicle according to the manufacturer's instructions, the test loads shall not be applied at one point only.

6.16.2 Surfaces which, after installation of the rack, can be contacted by a sphere of 165 mm diameter shall not have parts with a radius of curvature less than 2.5 mm, unless the provisions of 6.3 can be applied.

6.16.3 Fastening elements, such as bolts that are tightened or loosened without tools shall not project more than 40 mm beyond the surfaces referred to in 6.16.2., the projection being determined according to the method prescribed in A-2, but using a sphere of 165 mm diameter in those cases where the method prescribed in A-2.2 is employed.

6.17 Aerials

6.17.1 Radio receiving and transmitting aerials shall be fitted to the vehicle in such a way that if their unattached end is less than 2 m from the road surface in any position of use specified by the manufacturer of the aerial, it shall be inside the zone bounded by the vertical planes which are 10 cm inside the extreme outer edge of the vehicle as defined in 3.6.

6.17.2 Furthermore, aerials shall also be so fitted to the vehicle, and if necessary their unattached ends so restricted, that no part of the aerials protrude beyond the extreme outer edge of the vehicle as defined in 3.6.

6.17.3 Shafts of aerials may have radii of curvature of less than 2.5 mm. However, the unattached ends shall be fitted with fixing cappings, the radii of curvature of which are not less than 2.5 mm.

6.17.4 The bases of aerials shall not project more than 40 mm when determined according to the procedure of A-2.

6.17.4.1 In cases where by the absence of a flexible shaft or part it is not possible to identify what the base is of an aerial this requirement is deemed to be met if, after a horizontal force of not more than 50 daN in forward and rearward direction is applied by a flat-ended ram of not more than 50 mm diameter at the most salient part of the aerial:

- a) The aerial bends towards the support and does not project more than 40 mm, or
- b) The aerial breaks off and the remaining part of the aerial does not show any sharp or dangerous part that can be contacted by the 100 mm sphere and does not project more than 40 mm.

6.17.4.2 The requirement of 6.17.4 and 6.17.4.1 shall not apply to aerials located behind the vertical transversal plane passing through the "R" point of the driver, provided that the maximum projection of the aerial including its housing does not exceed 70 mm when determined according to the procedure of A-2.

If the aerial is located behind that vertical plane but projects more than 70 mm, 6.17.4.1 shall apply using a projection limit of 70 mm instead of 40 mm.

7 EXTENSION OF APPROVALS

7.1 Every modification pertaining to the information, even if the changes are not technical in nature declared in accordance with Annex B shall be intimated by the manufacturer to the testing agency.

7.1.1 If the changes are in parameters not related to the provisions, no further action need be taken.

7.1.2 If the changes are in parameters related to the provisions, the testing agency, which has issued the certificate of compliance, shall then consider, whether, the external projections with the changed specifications still complies with provisions.

7.2 Any further verification is required to establish compliance.

ANNEX A

(Clauses 3.7 and 3.8)

METHOD OF DETERMINING THE DIMENSIONS OF PROJECTIONS AND GAPS

A-1 METHOD OF DETERMINING THE HEIGHT OF THE PROJECTION OF FOLDS IN BODY PANELS

A-1.1 The height H , of a projection is determined graphically by reference to the circumference of a 165 mm diameter circle, internally tangential to the external outline of the external surface at the section to be checked.

A-1.2 H is the maximum value of the distance, measured along a straight line passing through the centre of the 165 mm diameter circle, between the circumference of the aforesaid circle and the external contour of the projection (see Fig. 2).

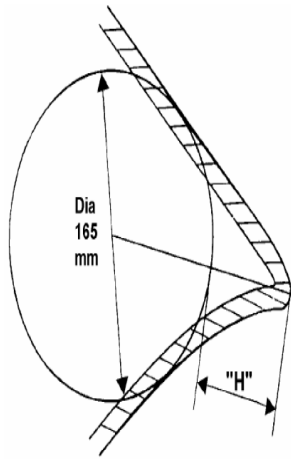


FIG. 2 METHOD FOR DETERMINATION OF HEIGHT 'H' BY DRAWING A CIRCLE OF 165 MM

A-1.3 In cases where it is not possible for a 165 mm diameter circle to contact externally part of the external outline of the external surface at the section under consideration, the surface outline in this area will be assumed to be that formed by the circumference of the 100 mm diameter circle between its tangent points with the external outline (see Fig. 3).

A-1.4 Drawings of the necessary sections through the external surface shall be provided by the manufacturer

to allow the height of the projections referred to above to be measured.

A-2 METHOD OF DETERMINING THE DIMENSION OF THE PROJECTION OF A COMPONENT MOUNTED ON THE EXTERNAL SURFACE

A-2.1 The dimension of the projection of a component which is mounted on a convex surface may be determined either directly or by reference to a drawing of an appropriate section of this component in its installed condition.

A-2.2 If the dimension of the projection of a component which is mounted on a surface other than convex cannot be determined by simple measurement, it shall be determined by the maximum variation of the distance of the centre of a 100 mm diameter sphere from the nominal line of the panel when the sphere is moved over and is in constant contact with that component. Figure 4 shows an example of the use of this procedure.

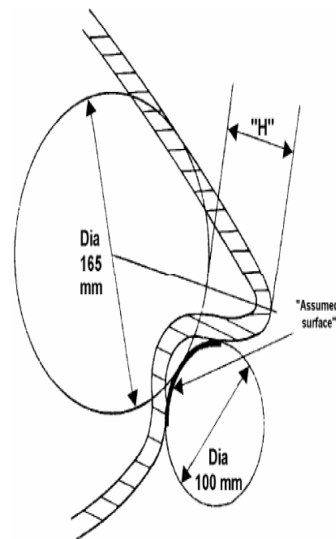


FIG. 3 METHOD FOR DETERMINATION OF HEIGHT 'H' BY DRAWING A CIRCLE OF 165 MM AND 100 MM

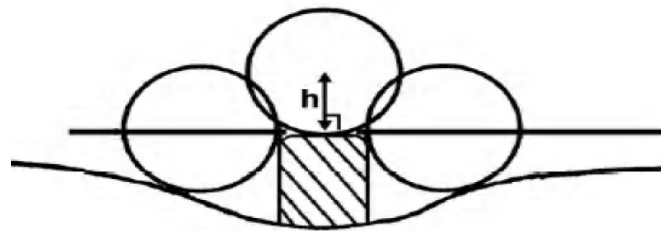


FIG. 4 METHOD OF DETERMINING THE DIMENSION OF THE PROJECTION OF A COMPONENT MOUNTED ON THE EXTERNAL SURFACE

A-3 METHOD OF DETERMINING THE PROJECTION OF HEADLAMP VISORS AND RIMS

The projection from the external surface of the headlamp shall be measured horizontally from the point of contact of a 100 mm diameter sphere as shown in Fig. 5.

A-4 METHOD OF DETERMINING THE DIMENSION OF A GAP OR THE SPACE BETWEEN ELEMENTS OF A GRILLE

The dimension of a gap or space between elements of a grille shall be determined by the distance between two planes passing through the points of contact of the sphere and perpendicular to the line joining those points of contact. Figure 6 and 7 show examples of the use of this procedure.

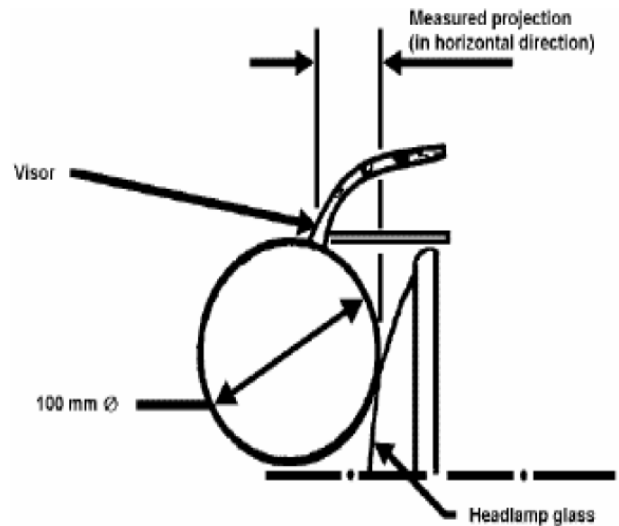


FIG. 5 METHOD OF DETERMINING THE PROJECTION OF HEADLAMP VISORS AND RIMS

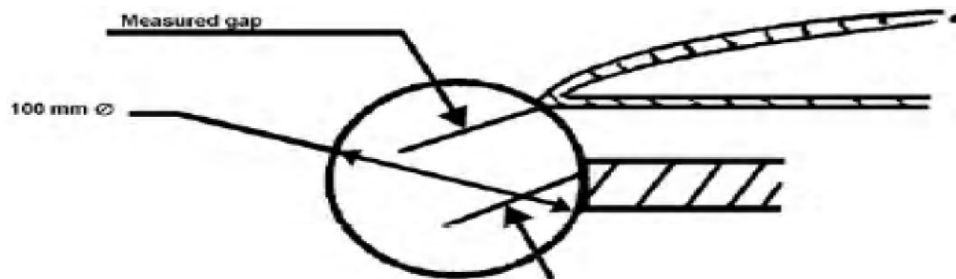


FIG. 6 METHOD OF DETERMINING THE DIMENSION OF A GAP OR THE SPACE BETWEEN ELEMENTS OF A GRILLE

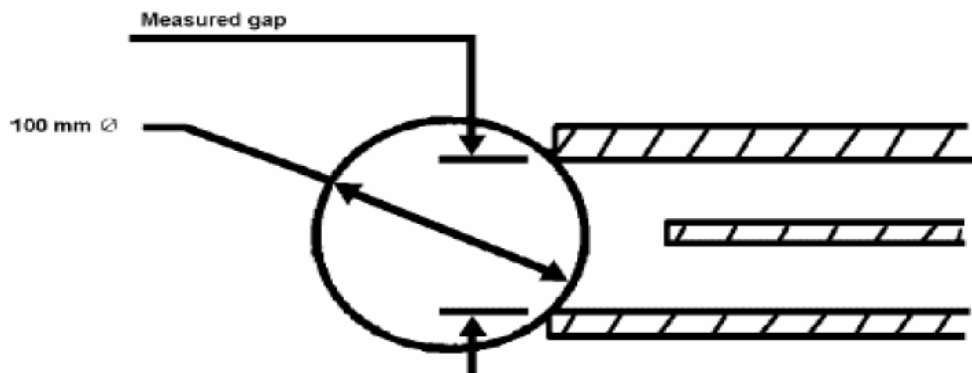


FIG. 7 METHOD OF DETERMINING THE DIMENSION OF A GAP OR THE SPACE BETWEEN ELEMENTS OF A GRILLE

ANNEX B

(*Clauses 4.2 and 7.1*)

B-1 TECHNICAL INFORMATION TO BE SUBMITTED BY VEHICLE MANUFACTURER

B-1.1 Name and Address of the Manufacturer

B-1.2 Manufacturing Plant and Address

B-1.3 Telephone No.

B-1.4 FAX No.

B-1.5 E-mail Address

B-1.6 Contact Person

B-1.7 Model and its Variants

B-1.8 Ornaments, mm

B-1.9 Projection for Head Light, mm

B-1.10 Radiator Grilles (applicable of on external surface), mm

B-1.10.1 *Gap Between Individual Elements, mm*

B-1.10.2 *Radius of Curvature of Individual Element, mm*

B-1.11 Body Panel

In case of radius of curvature of folds in body panels are less than 2.5 mm the scaled drawing of folds contour and h value as per annex a of this standard is required to be submitted.

B-1.12 Radius of Curvature of Lateral Rain/Air Deflector, mm

B-1.13 It Shall be Accompanied by the Following Documents in Triplicate

B-1.13.1 Photographs of the front, rear and side parts of the vehicle taken at an angle 30° to 45° to the vertical longitudinal median plane of the vehicle;

B-1.13.2 Drawings, with dimensions, of the bumpers and, where appropriate

B-1.13.3 Drawings of certain external projections and if applicable drawings of certain sections of the external surface referred to in **6.9.1**.

B-1.13.4 For every type of any one of the devices referred to in **6.16** and **6.17**.

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

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Amendments Issued Since Publication

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